DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED BAYPORT CONTAINER TERMINAL
PASADENA, HARRIS COUNTY, TEXAS

The responsible lead agency for the permit action is the U.S. Army Corps of Engineers, Galveston District (USACE) under the authority of Section 404 (33 U.S.C. 1344) of the Clean Water Act and Section 10 (33 U.S.C. 403) of the Rivers and Harbors Act.

Abstract:

The Draft Environmental Impact Statement (DEIS) was prepared as required by the National Environmental Policy Act (NEPA) to present information regarding the potential impacts of the Port of Houston Authority's proposed Bayport Container Terminal. The proposed project is located on a primarily upland area adjacent to the Bayport Ship Channel in the City of Pasadena. The DEIS addresses the direct, indirect, and cumulative impacts of the proposed development on human and environmental issues identified during the public interest review, including onsite and offsite alternatives. All factors that may be relevant to the proposed development were considered. Among those factors are air quality; dredged material management; surface transportation; economics; aesthetics and light; general environmental concerns; wetlands; cultural resources; fish and wildlife values; land use and coastal zone management; navigation; shoreline erosion; recreation; water quality; public safety; hazardous materials; social characteristics and environmental justice; noise; and in general the needs and welfare of the people. The DEIS provides relevant information to the public and the USACE on the potential impacts of the proposed project. The public response to the findings of the DEIS will provide direction for the preparation of the Final EIS (FEIS). The FEIS will be an informational document used by the USACE in its decision to grant or deny the permit.

Comments on this DEIS must be received by: February 11, 2002
DATE

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EXECUTIVE SUMMARY

E1.0 PROJECT OVERVIEW

The Port of Houston Authority (hereinafter referred to as "the Applicant") submitted a permit application to the United States Army Corps of Engineers (USACE), Galveston District on October 8, 1998. The purpose was to initiate the review process for the Applicant's plans to construct and operate a marine terminal complex on the Bayport Ship Channel. A permit is required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act because the Applicant proposes to discharge dredged or fill material into waters of the United States and to do work in navigable waters of the United States. The permit application was revised and resubmitted by the Applicant on October 15, 2001. A copy of the application is included in Appendix 1-1.

Pursuant to the National Environmental Policy Act (NEPA), the USACE has determined that issuing a permit for the Applicant's Proposed Project would constitute a major federal action that may significantly affect the quality of the environment. As a result, preparation of an Environmental Impact Statement (EIS) under NEPA was undertaken to identify and evaluate a range of reasonable alternatives to accomplish the purpose of and need for the Proposed Project, and to evaluate potential effects that the action alternatives may have on the environment. The EIS for the Bayport Container/Cruise Terminal Project has been prepared by the USACE, with the assistance of a third-party contractor funded by the Applicant.

The project area proposed by the Applicant in its permit application to the USACE for the Bayport Container/Cruise Terminal is shown on Figure E-1. The Proposed Project would be developed on 1,091 acres along the south side of the Bayport Ship Channel, to the west of the Houston Ship Channel (HSC), and 25 miles southeast of downtown Houston. The Applicant currently owns approximately 1,086 acres of land at and near the Bayport site, but not all of their property is part of the Proposed Project site. If the complex were to be developed at this location, additional properties at Bayport would be acquired by the Applicant.

The Applicant's Proposed Project includes:

- 752 acres for a container terminal complex, including wharves, container yards, gate facilities, intermodal yards, container freight stations, ancillary and support facilities, and industrial codevelopment areas;
- 192 acres for a cruise terminal complex and related codevelopment areas; and
- 147 acres for buffer area and stormwater management area.

Proposed facilities would ultimately include approximately 7,000 linear feet of new wharves and berths for container operations and approximately 5,000 feet of wharves and berths for cruise operations. The Proposed Project also would require dredging a new 1,600-foot-diameter cruise turning basin on the south side of the Bayport Channel, east of the proposed cruise terminals.

Development of the proposed facilities would require improvement or new construction of 4.8 miles of road. Trucks would have direct access to the container terminal complex via new ramps connecting State Highway (SH) 146 to Port Road through a grade-separated gate entrance. A new rail track would be added from Strang Yard to the complex within an existing rail right-of-way, generally along SH 146. Rail track would be added in a new southern corridor that would require a new grade separation at SH 146 near Red Bluff Road and continue to the southern end of the intermodal terminal yard. Cruise terminal traffic would use a new road developed in this corridor to provide separation from truck traffic. A total of approximately 95 acres located outside the 1,079-acre project site would be used for new or improved rights-of-way for road and rail.

E1.1 THE APPLICANT'S STATEMENT OF NEED FOR ACTION

E1.1.1 Container Terminal Facilities

Container throughput in Houston has risen at an average growth rate of approximately 10 percent per year since 1992, increasing from 490,000 Twenty-ton Equivalent Units (TEU) in 1994 to 1,007,200 TEU in 1999. Statistics for container movements at the Applicant's terminals for 1980 - 2000 are provided in Appendix 1-4. This is a higher rate of growth in container cargo movement than that seen in the world at large. Studies performed through the Texas Transportation Institute (TTI) indicate a continued worldwide container movement growth rate of 7.2 percent through 2010. Additionally, the TTI studies indicate future growth rates as high as 13.1 percent for ports along the Gulf of Mexico. Based on an assumed growth rate of 10 percent, up to 28 new container berths would be needed in the Texas Central Gulf Region between 2001 and 2028 (JWD, 2001).

As a result of continued growth in container traffic experienced in the region, the Applicant is currently developing the final tract of land available for container operations at Barbours Cut. With development of this area, there will be no available land to further expand at Barbours Cut. Under the Barbours Cut Master Plan (Moffet & Nichols, 2000), improvements to the existing equipment and facilities are currently in progress and will be completed in phases over the next 10 to 15 years. The purpose of improvements at Barbours Cut is to accommodate container growth until additional container capacity can be developed elsewhere in the Port of Houston, to replace and extend the life of aged facilities, and to improve operational efficiencies.

The Applicant also has leased a terminal in the Port of Galveston capable of handling approximately 100,000 TEU per year. This space was underutilized in 1997 and 1998, since most carriers preferred to unload closer to the Houston metropolitan market. However, due to congestion at other port facilities and economic incentives provided by the Applicant and the Port of Galveston, the Galveston facility handled approximately 76,000 TEU in 2000.

Other facilities at the Port of Houston, such as those along the Turning Basin (Figure E-2), are also being used to handle containers. In 2000, 80,012 TEU, or approximately 7.5 percent of the Applicant's total container volume, was handled at the Turning Basin. However, terminals at this location were not designed for container operations and are ill suited for such use, as they can serve only smaller vessels

that require smaller cranes and less upland storage area. The projected need for increased capacity to handle additional container cargo cannot be met by these facilities.

Container throughput at the Applicant's facilities grew at an average growth rate of approximately 10 percent per year between 1992 and 1999; however, growth slowed dramatically between 1999 and 2000, growing by only 3 percent. The Applicant projects this trend of diminishing (flat-lining) container throughput growth to continue as its existing container facilities are at capacity.

To meet the projected container growth for the area, it is the Applicant's intent to develop a modern load center facility or facilities with sufficient waterfront and upland area behind the berths to deploy, organize, and load/unload containers to/from trucks and rail. This would include integration of efficient intermodal systems (water, rail, and highway), warehousing, and storage. Without additional container facilities, the Applicant states that it would not be able to fulfill its mission to provide, operate, and maintain cargo/passenger facilities, promote trade, generate favorable economic effects, and contribute to the economic development of the Port of Houston, the City of Houston, the communities of Harris County, and the Texas Coastal Region.

Therefore, the Applicant has identified the following minimum needs for new container facilities:

- 1,660 feet of new container berth and 65 acres of new terminal backland by 2004; and
- An additional 5,340 feet of container berth and 693 acres of terminal backland developed incrementally by 2024, assuming a continued 5 percent annual growth in container cargo in the Gulf Coast Region.

These facilities would help meet the projected demand in container cargo growth and allow the Applicant to fulfill its mission as a major international port.

E1.1.2 Cruise Terminal Facilities

The Applicant's business plan includes provisions for diversifying its business base to include the cruise industry. The International Council of Cruise Lines' (ICCL) 1999 economic impact study showed that in 1997 the cruise industry generated $15 billion in revenue for the United States economy, primarily in the top seven cruise port cities: Miami, Los Angeles, New York, Seattle, Tampa, Port Canaveral, and Fort Lauderdale. This economic impact is projected to increase to $18.3 billion by 2002. The cruise industry also provided some 450,000 jobs, which generated $14.5 billion in wages and $6.3 billion in domestic tax revenue. News releases from the ICCL reporting these statistics are included in Appendix 1-4.

In May 1997, the first cruise sailed from the new Barbours Cut Cruise Terminal. Since then, over 285,000 passengers have used this terminal for cruise vacations. The ICCL economic study further documented that in 1999 the cruise industry had $221 million in direct spending in Texas and created 4,400 local jobs.

The success of the cruise business demonstrated the future potential of Houston for the cruise industry. The cruise industry is growing and is looking for new markets and home ports. According to a recent cruise industry publication (Appendix 1-4), 37 new cruise vessels are presently contracted for or under construction. However, being able to participate in the growing business requires large, highly efficient terminal facilities that cannot be provided at Barbours Cut due to space limitations.

Attracting new cruise lines, ships, and passengers will require new landside and dockside cruise terminal facilities. These facilities must be able to handle the larger ships and their increased passenger loads, as well as the support services these large vessels require. Private interests would likely develop associated codevelopment facilities.

E2.0 PROJECT ALTERNATIVES

E2.1 LOCATION, LAND AREA, AND ACCESS REQUIREMENTS FOR NEW CONTAINER TERMINALS

The requirements of modern container vessels and increased cargo throughput significantly influence physical requirements for new terminal facilities. Future berths will need to have a minimum length of 1,000 feet, with depth and channel dimensions sufficient to accommodate modern container vessels. Based on industry planning criteria, each berth would require approximately 100 gross acres of backland, comprised of 50 acres for container storage and processing and 50 acres for support operations and infrastructure (such as intermodal, stormwater management, and maintenance facilities). For efficient cargo operations, backland must be located directly behind and contiguous to the berth.

For the foreseeable future, most containerized cargo shipped through Gulf of Mexico ports, including the Port of Houston, will be carried by Panamax class ships, which include the largest ships able to transit the Panama Canal. The largest of these ships are approximately 960 feet long and 105 feet wide, are able to operate in water depths of 40 feet, and are able to carry up to 4,000 TEU. To meet market demands of the shipping industry, the Applicant must be able to accommodate the throughput of containers based on existing and reasonably foreseeable market projections. This includes having facilities large enough to accommodate more Panamax vessels, as well as eventually even larger post-Panamax vessels.

Each new unit of a 1,000-foot berth and associated backland is projected to provide an ultimate throughput capacity of approximately 200,000 containers per year. Modern terminals also require an efficient roadway linkage to the highway system, since the majority of landside container movements are by truck. However, as container movements increase, it is optimal for terminals to have an on-dock or near-dock intermodal rail yard for transferring containers onto rail cars, along with access to an existing mainline railroad system.

E2.2 Site Development Requirements for a Container Terminal Facility

In order to be competitive in the existing seaport environment, a modern container terminal should meet several important operational requirements. The terminal should have berths and wharves of sufficient size to accommodate projected vessel traffic. New container vessels require that each berth have a minimum length of 1,000 feet, a minimum width of 125 feet, and a minimum depth of 40 feet. The backland directly behind and contiguous to each berth should include approximately 100 acres for container storage and processing, support operations, and support infrastructure. The terminal should have a sufficient number of container cranes to meet the throughput requirements of steamship lines, and those cranes should have the outreach sufficient to reach across the full width of the vessel.

The backland behind each berth should provide for the storage and staging of containers transiting the facility. Included are facilities to provide power to refrigerated containers, facilities for minor container and chassis maintenance, and gate facilities for the inspection, receipt, and delivery of container equipment and cargo. Additional facilities could include docks and warehouses for loading or unloading cargo from containers, facilities to accommodate U.S. Customs and U.S. Department of Agriculture cargo inspections, administrative offices, and maintenance facilities for container-handling equipment.

The terminal must have utilities such as electric power, water, and sewage collection to meet the operational requirements of ships, cranes, cargo processing facilities, maintenance facilities, and administrative facilities. It also must include facilities for collection and treatment of stormwater. The terminal operating areas must be illuminated to meet applicable safety requirements, and both lighting and utility services must be designed to allow the greatest practical flexibility in the use and layout of the container storage areas.

Internal roadway systems should allow efficient flow of traffic between the wharves, container storage/processing areas, the gate facility, and the intermodal rail yard. Rail access to the intermodal rail yard should be designed to minimize interference with container and truck movements within and among the terminal facilities.

E2.3 SITE IDENTIFICATION PROCESS

A three-tiered approach for identifying potential locations for new container facilities was undertaken. This approach is described briefly below and in more detail in the following sections:

- A Tier 1 evaluation applied a broad set of basic siting criteria to identify a wide range of possible locations for terminal facilities in the Galveston Bay/Freeport vicinity;
- A Tier 2 evaluation applied a set of basic operational, social, and environmental criteria to identify which of the possible locations should be eliminated from further consideration;
- A Tier 3 evaluation, which consisted of a more focused and refined evaluation of the locations which remained after the Tier 2 evaluation, using the same Tier 2 operational, social, and environmental criteria; and
- The sites remaining after the Tier 3 evaluation formed the set of alternative terminal locations considered in this study.

E2.3.1 Tier 1 Evaluation to Identify Potential Terminal Location Alternatives

A Tier 1 set of criteria was developed to identify a list of preliminary sites for new container facilities. Criteria included:

- A minimum of 200 acres of upland property;
- Accessibility to an existing deep-draft channel by either an existing or new channel;
- The potential to develop a minimum of 2,000 feet of berth and wharf; and
- Location in the Galveston Bay/Freeport vicinity.

E2.3.2 Results of the Tier 1 Evaluation Process

A large number of possible locations around Galveston Bay and at Freeport, Texas, were evaluated using the Tier 1 criteria. Sites outside this area, such as sites in Beaumont and Corpus Christi, were not included due to their distances from the Houston-Galveston market. Seventy-eight preliminary sites were identified for further analysis using the Tier 2 criteria. The location of these sites is shown in Figure E-3. Three additional sites (#2, #22, and #59) were initially identified, but were dropped when it was found they did not meet the Tier 1 criteria.

E2.3.3 Tier 2 Evaluation to Identify Potential Terminal Location Alternatives

Each of the 78 preliminary sites from the Tier 1 evaluation was evaluated against a set of Tier 2 criteria to identify which should be eliminated from further consideration. Tier 2 criteria included:

- Navigational access,
- Dredging requirements,
- Available backland,
- Land Development Constraints Associated with Existing Land Use,
- Road access,
- Rail access,
- Potential social impacts, and
- Potential environmental impacts.

E2.4 ALTERNATIVES CONSIDERED AND DISMISSED

E2.4.1 Conclusions of the Tier 2 Evaluation Process

Information concerning each of the 78 preliminary sites is presented in Table E-1. The evaluation of the 78 preliminary sites focused on identifying those sites that clearly do not meet one or more of the Tier 2 evaluation criteria. The Tier 2 evaluation process left the remaining 11 locations as potential candidates for Tier 3 evaluation.

- #1 – Alexander Island,
- #7 – Bayport,
- #10 – Beltway 8/HSC,
- #21 – Cedar Point,
- #53 – Spilmans Island,
- #57 - Shoal Point,
- #61 – Upper San Jacinto Bay,
- #78 –Freeport A,
- #79 - Pelican Island A,
- #80 – Pelican Island B, and
- #81 – Freeport B.

E2.4.2 Conclusions of the Tier 3 Evaluation Process

The remaining 11 sites listed above were assessed to determine which individual sites, or combinations of sites, could provide sufficient berth length and backland area to support the development of up to 7,000 feet of container berth and 700 acres of terminal backland for container operations. Since the cruise terminals proposed by the Applicant might be located at a separate location, berth length and backland area for these facilities were not considered at this stage of the analysis. Two groups of individual sites were identified:

- Those sites large enough to individually provide adequate berth length and backland for the proposed facilities; and
- Those sites not large enough to individually provide adequate berth length and backland area for the proposed facilities but that might be combined to provide adequate berth length and backland for the proposed facilities.

Individual sites that were not large enough to provide adequate berth length and backland area were evaluated to determine if any could be combined to meet the Applicant's purpose and need for their proposed facilities. Sites determined to be large enough to individually provide adequate berth length and backland area included:

- #7 – Bayport,
- # 53 - Spilmans Island,
- #21 - Cedar Point,
- #10 - Beltway 8/HSC,
- #57 - Shoal Point,
- #1 - Alexander Island,
- #79 - Pelican Island A, and
- #81 - Freeport B.

The following four sites were deemed not large enough to individually provide adequate berth length and backland area to satisfy the Applicant's purpose and need for additional container and cruise terminal capacity without being used in combination with one or more additional sites. Therefore, they were eliminated for further consideration in this EIS as standalone sites. However, these four individual sites, if combined, could provide adequate berth length and backland area to accommodate the Applicant's proposed facilities.

- #57A - Texas City Property on Shoal Point (Texas City Site),
- #80 - Pelican Island B,
- #78 - Freeport A, and
- #61 - Upper San Jacinto Bay.

The following seven potential combination alternatives were identified:

- Combination A (#7 and #57A),
- Combination B (#7 and #61),
- Combination C (#57A, #80, #78, #7),
- Combination D (#7, #80, and #78),
- Combination E (#61, #80, #78, and #7),
- Combination F (#7, #61, #80),
- Combination G (#57A, #61, #80, #7).

The Tier 3 evaluation included a more focused and refined application of the eight criteria presented in Section E2.3.3 above to the eight individual sites and seven combinations of sites determined to be individually large enough to provide adequate berth and backland area as discussed in the previous sections. The evaluation of each of these 15 alternatives is summarized in Table E-2.

The evaluation process identified inadequacies with three individual and five combination alternatives. These eight alternatives were eliminated from further analysis in this EIS:

- Beltway 8 Site,
- Alexander Island,
- Freeport B, and
- Combinations C,D,E,F, and G

The Tier 3 evaluation process left the remaining seven locations, or combination of locations, as reasonable alternative terminal facility locations:

- #7 – Bayport,
- #21 – Cedar Point,
- #53 – Spilmans Island,
- #57 – Shoal Point,
- #79 - Pelican Island,
- #57A and # 7 – Shoal Point/Bayport, and,
- #61 and #7 – Upper San Jacinto Bay/Bayport.

Each of the above locations was identified as reasonable alternatives and is the subject of further analysis in this EIS. Each of these seven alternatives, along with the No Action Alternative is described in more detail in the following sections.

E3.0 ALTERNATIVES IDENTIFIED FOR FURTHER ANALYSIS

Each of the seven action alternatives identified for further analyses are shown in relation to each other on Figure E-4. The following sections describe the No Action Alternative, and provide a brief description of the conceptual development plan for each of the seven action alternatives considered in this EIS.

E3.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Applicant would not develop the proposed terminal complexes at any location.

It has been assumed that under the No Action Alternative, the Applicant-owned portion of the Bayport site would be developed for other types of port facilities similar to those now located along the western portion of the Bayport Channel, consistently with the current land use designation. Likely facilities include liquid bulk cargo terminals, petrochemical facilities, and similar industrial facilities requiring direct waterfront locations. Future unrelated developments on the remainder of the Bayport site and at the alternative terminal location sites, with their associated impacts, could also occur.

E3.2 BAYPORT TERMINAL LOCATION ALTERNATIVE

The Bayport terminal location alternative included in the Applicant's permit application to the USACE involves constructing and operating a marine terminal complex on approximately 1,091 acres along the south side of the Bayport Ship Channel (Figure E-5).

The Bayport Container Terminal and Cruise Ship Facilities site would consist of:

- 30 acres of wharf,
- 374 acres of container yard,
- 71 acres of gate facilities,
- 123 acres of intermodal yard,
- 47 acres of ancillary buildings and parking,
- 45 acres of container freight station,
- 62 acres of industrial co-development,
- 93 acres of cruise terminals,
- 99 acres of cruise-related co-development,

- 121 acres of buffer areas,
- 26 acres of stormwater management areas beyond those within the buffer areas, and
- Berthing areas and a new turning basin.

Construction of the proposed container and cruise berths to a depth of 40 feet MLT with a 2-foot overdredge would generate approximately 4,945,800 cubic yards of material for placement. This dredging would be accomplished over 15 to 20 years, consistent with the conceptual development. Such material would be utilized to construct berms and as fill in facilities construction.

Future navigational improvements would include a 1,400-foot-diameter cruise turning basin dredged to a depth of 33 feet MLT, with a 2-foot overdredge. This turning basin dredging would generate approximately 1,924,195 cubic yards of material for placement. In the future, this turning basin would be enlarged to 1,600 feet in diameter with a depth of 40 feet MLT, with a 2-foot overdredge, producing approximately 2,127,000 cubic yards of dredged material for placement. The total area of dredging, excavation, and fill associated with constructing the proposed berths, turning basin, and adjacent transition areas is approximately 191 acres (Table E-3). This dredging would be accomplished over 15 to 20 years, consistent with the conceptual development of the container and cruise facilities. As indicated in the permit application, the dredged material would be utilized in beneficial use projects, such as marsh creation, at other locations in Galveston Bay.

E3.2 SPILMANS ISLAND TERMINAL LOCATION ALTERNATIVE

The layout for a terminal complex at Spilmans Island is presented Figure E-6. The proposed facility would include construction dredging of a new channel that would extend northwest from the existing Barbours Cut Channel. Seven container terminals would be constructed along the northeast side of this new channel. The facility would also include three cruise terminals on the northwest and southwest sides of the channel. Roadway access would be provided by Broadway Boulevard and Barbours Cut Boulevard or by a new road connecting to SH 146 along the north side of an existing rail right-of-way. The facility would include an intermodal rail yard on the west side, with rail service provided by a connection to the Southern Pacific rail line now serving the adjacent Barbours Cut Terminal. The design of the terminal complex would be similar to the Bayport terminal location alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal and cruise terminal complex capacities.

The newly dredged open water area would be approximately 7,000 feet long and 2,200 feet wide, which would include a navigational channel, two turning basins, and berthing areas. This area has been assumed to have a depth of 40 feet. Approximately 27 million cubic yards (mcy) of material would be dredged to create the navigational channel. The total area of dredging, excavation, and fill associated with constructing the proposed berths, turning basin and adjacent transition areas is approximately 291 acres (Table E-3). Fine sediments that exist at the site from previous maintenance dredging would be removed for the new channel and would be placed into other confined placement areas. Coarser sediments would be used to the extent practical to raise the elevation of the development areas at Spilmans Island.

E3.3 SHOAL POINT TERMINAL LOCATION ALTERNATIVE

The layout for a terminal complex at Shoal Point is presented in Figure E-7. This facility would include seven container terminals adjacent to the north shore of the existing placement area along the existing Texas City Channel. Development of these seven terminals would require filling an area of submerged lands at the east end of the existing placement area. The terminal layout also includes three cruise terminals to be developed adjacent to the existing Texas City Turning Basin.

Dredging would be required to provide access to the piers and bulkhead of the container and cruise berths. The terminal layout includes an intermodal rail yard south of the container terminals. A new road and rail corridor that would be located over or adjacent to an existing drainage canal to the west would provide surface access to the terminal complex. The access road would connect to Interstate (I) 45 at the Loop 197 interchange. The rail spur would connect to the existing Texas City Terminal rail lines near the SH 341 and Loop 197 interchange. The design of the terminal complex would be similar to the Bayport terminal location alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal capabilities. The cruise terminal complex would be similar to that proposed by the Applicant at Bayport, but would consist of only three terminals.

Development of these facilities would require the dredging and placement of approximately 14 mcy of sediments from the existing Texas City Channel and the terminal channel. The total area of dredging, excavation, and fill associated with constructing the proposed berths, turning basin, and adjacent transition areas is approximately 237 acres (Table E-3).

E3.4 CEDAR POINT TERMINAL LOCATION ALTERNATIVE

The layout for a terminal complex at Cedar Point is presented in Figure E-8. The layout for this alternative calls for excavating a new channel area into the Cedar Point property. Excavation would include an area 5,500 feet long and 600 feet wide for a harbor channel and ship berths, as well as an area 3,000 feet long and 2,200 feet wide for a turning basin and berthing areas. Seven container terminals would be developed along the south side of this harbor channel and turning basin. Five cruise terminals would be developed on the east and north sides of the turning basin. An intermodal rail yard would be located at the east side of the development, and a new transportation corridor extending to the north would provide road and rail access. The access road would connect to FM 1405 at U.S. Steel Road. The rail line would connect to Union Pacific lines via the rail spur now serving the industrial facilities north of the site or via a new dedicated spur. The design of the terminal complex would be similar to the Bayport alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal and cruise terminal capacities.

This facility layout would require that a new entrance channel be dredged from the HSC through Atkinson Island and the associated beneficial use site to the terminal site. This channel has been assumed to be approximately 15,000 feet long, with a top width of 500 feet and a depth of 40 feet. The harbor channel and turning basin are also assumed to have a depth of 40 feet. Total dredging volume to create the entrance channel, harbor channel, turning basin, and berths is approximately 29 mcy. The total area of dredging excavation and fill associated with constructing the proposed berths, turning basin, and adjacent

transition areas is approximately 419 acres (Table E-3). It is anticipated that some of this material would be used to raise the elevation of the terminal development area. Additional material would likely be used to create wetlands in Galveston Bay and/or be placed in confined placement areas in and adjacent to the bay.

E3.5 PELICAN ISLAND TERMINAL LOCATION ALTERNATIVE

The layout for a terminal complex at Pelican Island is presented Figure E-9. This facility would include new construction dredging of a harbor channel extending west from the existing Galveston Channel. Seven container terminals and three cruise terminals would be constructed along the north side of this new channel. Roadway access would be provided by an improved connection to I 45, including a new multilane fixed bridge over the upper reach of the Galveston Channel and improvements to Harborside Avenue (SH 275). The facility would include an intermodal rail yard, with rail service provided by a connection to Burlington Northern Santa Fe, Union Pacific, and Galveston Houston and Henderson rail lines now serving the Port of Galveston. This connection would include a new lift bridge across the upper reach of the Galveston Channel. The design of the terminal complex would be similar to the Bayport terminal location alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal capabilities. The cruise terminal complex would be similar to that proposed by the Applicant at Bayport, but would consist of only three terminals.

The new harbor channel and berthing area would be approximately 13,000 feet long and 500 feet wide, would include two turning basins, and has been assumed to have a depth of 40 feet. Approximately 20 mcy of material would be dredged to create the navigational channel. The total area of dredging excavation and fill associated with constructing the proposed berths, turning basin, and adjacent transition areas is approximately 223 acres (Table E-3). Fine sediments that exist at the site from previous maintenance dredging would be removed for the new channel and placed into other nearby confined placement areas. Coarser sediments would be used to the extent practical to surcharge, and raise the elevation, of the necessary development areas on Pelican Island.

E3.6 SHOAL POINT/BAYPORT TERMINAL LOCATION ALTERNATIVE

Figures E-10 and E-11 depict the facility layouts for the Shoal Point/Bayport terminal location alternative. Under this alternative, three container terminals would be developed at Shoal Point as shown in Figure E-10 and four container terminals and five cruise terminals would be developed at the Bayport site as shown in Figure E-11. The Shoal Point facility would include an intermodal rail yard, and road and rail access would be similar to that described for the Shoal Point terminal location alternative (Section 2.4.5). The design of the container terminal complex at Shoal Point would be similar to the Bayport alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal capabilities. No cruise passenger terminals would be developed at the Shoal Point site under this alternative.

The facilities at the Bayport site would include an intermodal rail yard similar to that included in the Bayport terminal location alternative. The design of the terminal complex would be similar to the Bayport alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal and cruise terminal capacities. Road and rail access to these new facilities would be provided by improvements similar to those included in the Bayport terminal location alternative (e.g., widening of Port Road east of SH 146), plus a new southern transportation corridor extending from the intersection of SH 146 and Red Bluff Road around the southern side of the new facilities. Road access to the cruise passenger terminals and rail access to the intermodal yard would be provided within the southern transportation corridor.

Even though the Bayport facility component of this alternative includes a turning basin and berth construction similar to the Bayport terminal location alternative, this alternative would require somewhat less dredging due to the reduced number of berths. Similarly, this alternative would require somewhat less dredging at Shoal Point than projected for the full Shoal Point terminal location alternative due to the reduced number of container berths and the elimination of the cruise terminals at this location. The total dredging volume required for both facilities under this combination alternative is estimated to be approximately 12 mcy. The total area of dredging excavation and fill associated with constructing the proposed berths, turning basin, and adjacent transition areas is approximately 251 acres (Table E-3).

E3.7 UPPER SAN JACINTO BAY/BAYPORT TERMINAL LOCATION ALTERNATIVE

Figures E-11 and E-12 depict the facility layouts for the Upper San Jacinto Bay/Bayport terminal location alternative. This alternative uses the same Bayport facility components as the Shoal Point/Bayport alternative. Under this alternative, three container terminals would be developed on the west side of Upper San Jacinto Bay, west of Alexander Island and next to the existing Reliant Energy Houston Lighting and Power facility (Figure 2-10). Navigational access to the site would be provided by a new deepwater channel extending south from the HSC on the east side of Alexander Island. Road and rail access to the site would be provided by improvements to existing roads and a rail spur that provides access to the Reliant Energy/Houston Lighting & Power facility. The internal design of the terminal complex would be similar to the Bayport terminal location alternative in terms of comparable levels of service for paved area, lighting, drainage, and container/intermodal and cruise terminal capacities.

Approximately 11 mcy of sediments would be dredged to create the access channel and turning basin in Upper San Jacinto Bay. The total projected dredging volume for this alternative is approximately 18 mcy. The total area of dredging, excavation, and fill associated with constructing the proposed berths, turning basin, and adjacent transition areas is approximately 357 acres (Table E-3).

E4.0 ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

The following elements are common to all seven Action Alternatives:

- Container berths are each 1,000 linear feet for a total of 7,000 linear feet for the full buildout. A seven-berth container terminal has a projected throughput capacity of 1.4 million containers per year or about 2.3 million TEUs;
- Passenger cruise terminal berths are each 1,000 linear feet, with up to 5,000 linear feet, depending upon the alternative. Each passenger cruise terminal/berth would provide an estimated annual throughput capacity of 240,000 passengers;
- Turning basins (or notches) vary from 1,500 to 2,000 feet in diameter;
- Once fully operational, container operations would generate an estimated 16,181 one-way daily total vehicle trips including 9,000 heavy duty truck trips of which approximately 70 percent would include a container;
- Once fully operational, container operations would generate an estimated 54 one-way container ship transits weekly; and
- Once fully operational, cruise operations would generate between 18 and 24 one-way cruise ship transits weekly (depending on a 3 or 5 berth cruise terminal).

E.5.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

E5.1 INTRODUCTION

This section provides a brief summary of the environmental consequences associated with the Proposed Project for each of the 19 environmental topics analyzed in this EIS. Supporting detail, a description of the study area, and analyses are found in Chapter 3.0.

E5.2 LAND USE AND COASTAL ZONE MANAGEMENT

Construction of the proposed container and cruise terminal complexes would change existing land use at the Bayport terminal location alternative from undeveloped vacant property to that of a maritime transportation facility. Offsite related support facilities would be limited because the Bayport site is large enough to support many of the ancillary activities associated with container terminal locations. The Coastal Natural Resource Areas (CNRA) that would be impacted by development at the Bayport site are listed in Table E-5.

E5.3 SOCIOECONOMICS

By 2030, the proposed terminal development would create an additional 39,309 direct and indirect jobs. The increase in cargo and cruise activities resulting from the terminal development would generate $10.4 billion of personal income, nearly $19 billion of business revenue, and $5.5 billion of indirect purchases. These revenues would result in an additional $1.1 billion of state and local taxes. Resulting employment and revenue growth would be long-term, beneficial impacts.

Construction of any of the alternatives would create new construction jobs ranging from 73 in 2001, to a high of 2,368 jobs in 2002, to 457 jobs in 2023, the last year that construction occurs. Projected annual personal income from the construction jobs ranges from $2.15 million in 2001, to $69.5 million in 2002, to $13.4 million in 2023. These construction jobs and wages would produce additional state and local tax revenues ranging from $0.297 million in 2001, to $9.629 million in 2002, to $1.86 million in 2023. The resulting employment and revenue growth from construction would be short-term beneficial impacts. The proposed terminal complex is estimated to cost approximately $1.017 billion.

E5.4 SOCIAL CHARACTERISTICS AND ENVIRONMENTAL JUSTICE

By 2030, the proposed terminal facilities would create an additional 39,309 direct and indirect jobs, and would result in an additional 300 residents in Chambers County, 2,900 residents in Galveston County, and nearly 50,000 residents in Harris County. This employment and population growth would be beneficial, long-term impacts.

No community properties would be acquired or relocated for the construction of the proposed facilities. Development of the proposed facilities would require acquisition of a portion of the American Acryl property and the moving of pipelines. Construction of the terminal complex would not divide any existing residential communities. Additionally, the terminal complex would not disproportionately affect minority and low-income populations.

E5.5 SURFACE TRANSPORTATION

The purpose of this section is to provide an assessment of existing and future traffic conditions and to identify the impacts of the traffic generated by the new terminal on study area roadways and intersections.

Trip Generation

To estimate the number of vehicle trips that would be generated by the proposed terminals, a data collection program was conducted for the existing Barbours Cut Terminal. As part of this effort, the number of container units entering and exiting the facility during the count period was obtained. From the count database and the container throughput projections, a trip generation rate was calculated for each of the study years, based on the number of vehicle trips per container unit transported via truck. The projected trip generation is as follows:

Year	Daily Trips	Peak Hour Trips
2005	1,394	126
2015	7,108	642
2025	16,181	1,462

Truck trips represent approximately 56% of the values listed above. Truck traffic includes not only container traffic but also other types and sizes of trucks. Of the approximately 16,000 daily trips generated by the new terminal for the year 2025, approximately 8,000 trips are inbound and 8,000 trips are outbound. Approximately 9,000 trucks per day would be generated by the new terminal for the year 2025, with approximately 4,500 inbound trucks per day and 4,500 outbound trucks per day.

Trip Distribution

Project traffic was distributed in the study area roadway network using two primary sources: 1) the trip routing patterns from the adopted H-GAC travel forecast model and 2) the results of the origin and destination survey of container truck traffic at the Barbours Cut Terminal. The major routes for the projected traffic from the proposed facilities are expected to include Port Road and SH 146.

Summary of Future Conditions

Several roadway improvements would be needed in the Bayport study area for roadways impacted by the proposed facilities. Facilities such as SH 146, Red Bluff Road, and Port Road would need improvements in future years. A total of 20 and 35 lane miles of improvements would be needed on roadways impacted by the project by the year 2015 and 2025, respectively. The majority of the roadway improvements would be needed with or without the project. The exceptions would be the widening (from 2 to 4 lanes) of Port Road from the project site to SH 146 and proposed interchange and ramp improvements in the vicinity of the Port Road and SH 146 interchange.

Preparation of this EIS included a review of the planned improvements presented in the 2022 Metropolitan Transportation Plan for the Houston Galveston area. The 2022 MTP review indicates that approximately 46 lane-miles out of the 195 lane-miles identified for 2025 as needing improvements in the study area are already planned, either as part of the TIP, short range, or long range plans. In general, the majority of the study area roadways will require capacity improvements in the future due to projected growth.

E5.6 COMMUNITY INFRASTRUCTURE AND MUNICIPAL SERVICES

The construction and operation of the proposed container and cruise terminals at the Bayport location can be served by existing water supply and sanitary wastewater treatment facilities in the areas. Water service lines would need to be extended. Natural gas service can be supplied by connecting into existing services in the area. Terminal and vessel solid waste regulated under 33 CFR 158, would be disposed of by a certified private operator.

E5.7 NAVIGATION

If Martin Associates' projection that noncontainerized cargo would grow at 3.3 percent per year is applied conservatively to all commercial vessels, it is projected that total annual transits in the Galveston Bay system could increase from 123,063 per year (2,367 per week) in 2000 (USCG 2000) to an estimated 325,940 per year (6,268 per week) by 2030. This represents a 165 percent increase over 30 years. The proposed facilities considered in this study would contribute from 101 (or 1.61 percent) to 115 (or 1.83 percent) transits to the projected total Galveston Bay system transits. The occurrence of collisions, allisions, and groundings would likely increase in proportion to the number of vessel transits.

Development of the proposed container and cruise terminal facilities at the Bayport location would result in an increase in weekly transits by commercial vessels in the Bayport Channel from a total of 174 in 2000 to 393 in 2030. This would include 54 container ships, 24 cruise ships, 74 tug transits, and 36 bunker barge transits associated with the proposed facilities. Background traffic by commercial vessels calling on the existing facilities at Bayport will increase to 39 ship transits, 59 tug transits, and 107 tow transits per week. This compares with a projected increase from 174 to 465 weekly transits under the No Action Alternative due to the types of industrial facilities that would most likely develop.

E5.8 NOISE

Construction

Noise from construction would affect ambient levels on the project site and in the vicinity. The three primary activities associated with project construction would be: excavation and dredging of the Bayport Ship Channel, grading and moving of placed material over the site, and construction of berths and terminal facilities.

Noise from dredging at the closest residence would range from 45 dBA to 65 dBA when activity is occurring within the Bayport Ship Channel and 37 dBA to 57 dBA when activity is occurring within Galveston Bay. Nighttime (10:00 p.m. to 7:00 a.m.) dredging would result in a significant noise impact because sound levels would exceed 55 dBA at the closest residential receptors.

Noise from construction of wharves at the closest residence to the container terminal and cruise terminal would be approximately 63 dBA and 58 dBA, respectively. Nighttime (10:00 p.m. to 7:00 a.m.) drilling would result in a significant noise impact because sound levels would exceed 55 dBA at the closest residential receptors.

Project construction would also involve the use of bulldozers, graders, loaders, generators, cranes, concrete trucks, pavers, and miscellaneous trucks and equipment. Noise from construction may be audible at the closest residence; however, since this activity would be limited to the daytime hours (7:00 a.m. to 7:00 p.m.), no significant noise impacts would occur.

Operations

Major noise sources during operation would be cranes used to load and offload container and cruise vessels, loaders used to transfer containers to and from warehouses and onto trucks, and miscellaneous vehicles, and equipment used to facilitate cargo movement. Acoustical calculations were performed to estimate noise level from operations at the closest noise sensitive receptors. Project related noise exposure at any given location is based on the sum of noise from all major project components, the project cumulative sound level from operations, rail, and the intermodal yard at specific receptor locations.

Based on results from the traffic demand model, an acoustic model was used to calculate sound levels for each roadway segment under study. Results from the acoustical calculations show the sound levels along the Port Road access road would increase by approximately 3 dBA to 10 dBA in the year 2025 as a result of the terminal development. Since there are no noise sensitive receptors located along that roadway, no significant noise impacts would occur. Sound levels along the remainder of the roadways would decrease by approximately 0 dBA to 1 dBA as a result of the redistribution of vehicular traffic or increase by approximately 0 dBA to 3 dBA. These changes are less than the 5dBA standard used by the Federal Transit Administration to identify substantial impacts.

Acoustical calculations were performed to estimate noise from freight trains. The Taylor Lake subdivision is located approximately 500 feet west of the proposed train tracks. Residences at this subdivision are currently exposed to noise from vehicular traffic on SH 146 and from the existing railroad mainline located approximately 400 feet and 250 feet to the east, respectively. The noise level from SH 146 at the Taylor Lake subdivision was calculated to be approximately 68 dBA $L_{dn.}$ Noise from adding 4 trains to the existing mainline would be expected to increase the ambient noise environment by less than 1 dBA.

Cumulative project sound levels would be as high as 73 dBA at locations across the Bayport Ship Channel. Residences along the Bayport Ship Channel would be exposed to sound levels approximately 16 dBA to 22 dBA above the existing ambient noise level and sound levels that exceed 65 dBA L_{dn}. The dominant noise source at this location would be the loading/unloading of ships at the berths. These residences would be adversely impacted by this alternative. Sound levels at the residences in the vicinity of Surf Oaks would be approximately 62 dBA $L_{dn.}$ The sound level at these residences would be approximately 9 dBA above the existing condition, but would not exceed 65 dBA L_{dn}. The dominant noise source at this location would be the intermodal yard. These residences would also be adversely impacted by this alternative. No significant impacts would occur at any other locations.

Mitigation measures that could be implemented to reduce the noise impacts to those residential areas most likely to be affected by the proposed facilities are identified in Section 3.8 of the EIS.

E5.9 AESTHETICS AND LIGHT

The proposed facilities would result in changes to the visual character of the Bayport site itself from the current undeveloped condition to a brightly lit, 24-hour operated industrial facility including intermodal yards, vessel berths, and cranes. Residential areas surrounding the Bayport site would not experience substantial changes in nighttime ambient light levels due to the type of lighting proposed by the Applicant and the construction of earthen berms around the east and south sides of the proposed facilities. Operational lighting at the proposed facilities would lead to nightglow that would likely be visible from those residential areas.

E5.10 CULTURAL RESOURCES

Known and predicted cultural resources within and near the terminal location alternatives have been inventoried and evaluated for this study. Development of the proposed facilities at the Bayport location would directly impact Sites 41Hr881, 41Hr832, and 41Hr833, which have been determined ineligible for listing in the National Register of Historic Places.

E5.11 PARKS AND RECREATION

No impacts would occur to landside recreational properties near the Bayport site. The projected increase in commercial vessel traffic in the Bayport Channel (discussed in Section E5.7 above) would likely result in an increased potential for conflicts between recreational and commercial use of that portion of Galveston Bay near the Bayport Channel.

E5.12 AIR QUALITY

The development of the proposed terminal facilities would result in emissions from construction and operations. Construction-related NOx, SO2, and PM10 (diesel particulate and fugitive dust) airshed atmospheric loading would result in short-term adverse impacts. NOx, SO2, and PM10 (diesel particulate and fugitive dust) airshed atmospheric loading related to container terminal operations would result in long-term adverse impacts. NOx, and VOC emissions resulting from operation of the Proposed Project would result in long-term, less than significant, impact. CO emissions at nearby intersections result in air quality levels within the NAAQS. This would be a long-term, less than significant adverse impact.

E5.13 PUBLIC SAFETY

The construction and operation of the proposed container and cruise terminal facilities are not anticipated to adversely affect, or be affected by, various elements of public safety in the HGA. It is anticipated that residential, commercial, and industrial growth would continue into the future in the HGA, consistent with current growth projections. This would result in a commensurate growth in public safety services in the HGA and is expected to be adequate to serve the proposed project. Construction or operation of the terminal complex facilities would not affect hurricane evacuation. The proposed Bayport terminal project would, at full development, result in additional daily truck trips transporting hazardous materials in at least some portion of their loads. Therefore, the potential of a hazardous material spill occurring during truck transport would increase proportionally. Area public safety services are adequate to address this increase.

E5.14 HAZARDOUS MATERIALS

During construction of the proposed container and cruise terminals, the Applicant would require contractors working on the terminal development to have emergency response plans for hazardous materials and fuel products prior to initiating construction activities. The types of hazardous materials transported through the proposed terminal facilities are not expected to differ appreciably from the types that occur at the Barbours Cut facility. While the total volume of hazardous cargo would increase commensurate with the overall growth of cargo throughput, the quantity of hazardous materials is expected to remain below five percent of the annual cargo. The Applicant's proposed terminal complexes would include facilities, equipment, and personnel to respond to any spills of such cargo.

E5.15 SHORELINE EROSION

The proposed facilities would not have a significant adverse effect on shoreline erosion because short-term effects are not anticipated, and it is not expected to result in long-term shoreline erosion in either the bay or channel. The ultimate increase in average annual power density attributable to this alternative would be small. The proposed facilities would result in 393 average weekly transits by 2030. Vessel travel distance from the Gulf is 35 miles, but most of the transit is through open portions of the bay. The most sensitive and significantly exposed areas are presently protected, being protected by ongoing actions, or would be protected as part of future project construction. Because of wharf construction and shoreline armoring, there would be a small length of shoreline subject to the erosion due to vessel wakes.

E5.16 HYDROLOGY, DRAINAGE, AND FLOODPLAINS

Environmental impacts related to hydrology, drainage, and flooding include impacts on water bodies that may receive stormwater discharges from the terminal facilities, changes in land use affecting drainage patterns, construction within 100-year floodplains, and areas impacted by dredging to create additional water bodies. Construction of the proposed terminal facilities at the Bayport terminal location alternative would involve about 7 percent of construction within the 100-year floodplain along the shoreline of Bayport Ship Channel. The present land use would be altered, but the new drainage systems would be designed to comply with applicable floodplain regulations. With appropriate drainage system designs, stormwater from each alternative could be discharged to nearby receiving water bodies without any significant impacts on flooding conditions in the vicinity.

E5.17 WATER QUALITY

Construction and operation of the proposed container and cruise terminal complexes would comply with TPDES regulations for stormwater and wastewater discharges. The development of the proposed terminal complexes would result in the following general impacts to water quality in the vicinity of the site:

- Dredging activities to create berths, channels or turning basins would cause a short-term increase in the levels of suspended solids, turbidity, and a variety of chemical constituents (such as metals, organic compounds, and nutrients), but based on available sediment data it is not expected that such activities would cause a violation of applicable water quality standards;

- The construction of new berths, channels or turning basins would create areas of bay bottom where low levels of dissolved oxygen can be expected during summer months – a long-term impact;

- The nature of stormwater runoff into receiving waters would change in terms of volumes and flow rates due to the large addition of new paved areas;

- Stormwater discharges would include increased levels of constituents such as grit, oil and grease, petroleum hydrocarbons, and metals typical of roadways, parking areas, and vehicle maintenance facilities, with the levels of such constituents dependent on the effectiveness of stormwater management and treatment facilities implemented by the Applicant; and

- There would be an increased potential for periodic discharges of a wide variety of contaminants contained in cargo moving through the proposed facilities, with the level of such increased potentially dependent on the effectiveness of emergency preparedness and response programs implemented by the Applicant.

E5.18 SEDIMENTS AND DREDGED MATERIAL

Based upon dredge volume estimates provided by the Applicant, the initial phase of the terminal development would produce approximately 2.55 million cubic yards of excavated material. The next phase, construction of the 1,400-foot-diameter Cruise Turning Basin and 1,000 feet of the cruise terminal berth area, would require dredging of approximately 2.32 million cubic yards of excavated material. Future expansion of the Cruise Turning Basin (to a 1,600-foot diameter and a depth of -40 feet MLT plus 2-foot overdepth) and additional wharf facilities for the cruise terminal would require dredging an additional 4.13 million cubic yards of sediment. Thus, if the terminal complex were constructed, the wharf facilities and Cruise Turning Basin would require a cumulative dredging of approximately 9.0 million cubic yards of sediment. This dredging and excavation is expected to disturb approximately 150 acres of open bay bottom. The material to be dredged consists of sandy silt and silty sand surficial sediments, underlain by stiff, dense clays.

Dredged material from the construction of the container terminal facility and the first 1,000 feet of the cruise terminal berthing area would be placed onsite and used to raise the site elevation and construct a noise reduction berm. The material from the construction of the Cruise Turning Basin would be placed offsite in an existing placement area or used in a beneficial use project. Dredged material from the second phase of the project would also be placed in an offsite placement area or used in a beneficial use project. The offsite placement plan calls for placement of approximately 1.213 M cubic yards of dredged material in Placement Areas 14 and 15 adjacent to the HSC. In addition, some new work dredged material composed of stiff soil will be used to reconstruct levees at Placement Areas 15 and the Atkinson Island beneficial use marsh site. The remaining dredged material consisting of soft soils and stiff soils not used for levee construction would be placed within reconstructed cells as part of the beneficial use program for marsh construction.

Development of the proposed facilities would result in a modest increase in annual maintenance dredging volumes generated at the Bayport Channel. This would contribute to the future need for additional placement areas in Galveston Bay. The impacts of dredging activities would include both short-term and long-term changes in surface sediments, particularly in new deepwater areas. The surface sediments in the areas where deepening occurs would generally be finer after dredging than the sediments that were in the area prior to dredging.

E5.19 WETLANDS

The USACE has jurisdiction over wetlands in the United States under Section 404 of the Clean Water Act and has developed a comprehensive regulatory scheme to delineate and protect "jurisdictional" wetlands. Development of the proposed project would result in the loss of approximately 103.5 acres of non-jurisdictional freshwater wetlands, which are considered "aquatic resources." Environmental impacts and proposed mitigation for these resources are considered in Section E5.20 below.

The USACE has determined that 2.5 acres of jurisdictional wetlands are present on the Bayport site. The Applicant has proposed to mitigate for the loss of these 2.5 acres with the permanent creation of 12.4 acres of new wetlands on a site adjacent to the Armand Bayou nature Center and Taylor Lake.

E5.20 ECOLOGY

The projected loss of upland habitat at the Bayport terminal location alternative would be approximately 1,038 acres. Projected freshwater wetland impacts would be approximately 106 acres. However, only 2.5 acres of the 106 acres of wetlands are jurisdictional. Approximately 150.3 acres of bay bottom would be dredged and approximately 23.5 acres of intertidal mud flats and bay bottom would be filled for the Bayport terminal location alternative. Oyster reefs located near the mouth of the channel may be impacted.

There are no known populations of either federally or state listed threatened or endangered plant or animal species on the Bayport terminal location alternative, but two species of sea turtles (Kemp's Ridley and juvenile loggerhead sea turtles) and several protected bird species are transient visitors. These species are mobile and can avoid the area during construction. There would be a loss of foraging habitat for bird species. Increased ship traffic and dredging activities could potentially affect rare reptile species through risk of injury and possible disruption of movement patterns. An increase in turbidity during construction may temporarily impact habitat for these species.

Construction of the proposed facilities at this location would result in increased vessel traffic from both containerships and cruise ships. Both types of ships use minimal ballast water. This minimal introduction of ballast water would result in a small increase in the potential for introduction of exotic species into Galveston Bay.

Approximately 150 acres of bay bottom would be dredged and approximately 23.5 acres of intertidal mud flats and bay bottom would be filled for the proposed facilities. The National Marine Fisheries Service considers these areas as essential fish habitat. Increased vessel traffic would result in additional impacts to essential fish habitat.

The Applicant proposes to mitigate the impacts to aquatic resources on the Bayport site by the permanent preservation of 163 acres of existing habitat at a site adjacent to Armand Bayou and Taylor Lake. In addition, some of the dredged material generated by construction of the proposed facilities would be used to create estuarine marsh habitat at sites in Galveston Bay.

E6.0 SUMMARY COMPARISON OF ALTERNATIVES

E6.1 NON-ENVIRONMENTAL COMPARISONS

The No Action Alternative and each terminal location alternative and was examined in regard to the following non-environmental considerations:

- Availability of the Required Property to the Applicant;
- Operational Effectiveness; and
- Site Development Constraints.

The comparison of non-environmental considerations for each of the alternatives is summarized in Table E-4.

E6.2 ENVIRONMENTAL COMPARISONS

E6.2.1 Introduction

A comparison of environmental consequences for the No Action Alternative and each of the terminal location alternatives is provided in the following paragraphs and in Table E-5. This information has been developed from the analyses of the 19 environmental topics addressed in Chapter 3.0 of the EIS.

E6.2.2 Land Use and Coastal Zone Management

Construction of the proposed container and cruise terminal complex would change existing land use at the Bayport, Cedar Point and Pelican Island terminal location alternatives from either undeveloped vacant property or undeveloped rural land to that of industrial use. Construction of these facilities at Spilmans Island, Shoal Point, and a portion of Pelican Island would change the current land use from dredged material placement areas to industrial use. Construction of the proposed facilities at the Upper San Jacinto Bay site would not change the existing land use there. Offsite related facilities (such as yards for empty containers) may be expected at Spilmans Island, Shoal Point, and the Upper San Jacinto Bay sites since they are not large enough to accommodate all of the ancillary facilities that operate in association with a container terminal complex.

The Coastal Natural Resource Areas (CNRA) that would be impacted at each terminal location alternative are listed in Table E-5.

E6.2.3 Socioeconomics

Under the No Action Alternative the economic activity associated with the construction and operation of the proposed container and cruise terminal complexes would not occur. However, there would be economic benefits of a similar nature resulting from the development of alternative complexes at the Bayport site. Since the increased capacity for container throughput is assumed to be similar for all of the terminal location alternatives, there would be only marginal differences resulting from operational efficiency. Those terminal location alternatives that would support only three cruise berths would have less potential for economic impacts resulting from cruise operations. There would also be some differences in the geographic distribution of impacts due to the locations of the alternative sites.

E6.2.4 Social Characteristics and Environmental Justice

The proposed terminal complexes would create approximately 39,000 additional jobs by 2030. The projected distribution of additional residents resulting from these jobs for each terminal location alternative is presented in Table E-5. The number of residential and business relocations required for development of the terminal complexes at each of the terminal location alternatives is presented in Table E-5. This employment and population growth would be a beneficial, long-term impact at any of the terminal location alternatives.

No community properties would be acquired or relocated for the construction of any of the action alternatives. The Bayport alternative would require acquisition of a portion of the American Acryl property and the moving of pipelines. The Spilmans Island, Shoal Point, and portions of Pelican Island alternatives require the replacement of existing dredged placement areas. Power lines would also be relocated from the Spilmans Island site. The Cedar Point alternative would require the relocation of 16 residences, 4 pumping stations, and 5 pipelines that now transverse the terminal site. The Upper San Jacinto Bay component of the Upper San Jacinto Bay/Bayport alternative would require the relocation of several Reliant Energy storage tanks.

Existing communities would not be divided by development of the terminal complexes and associated surface transportation facilities at any of the terminal location alternatives. There would not be a disproportionate impact on minority or low-income populations associated with development of the complexes and associated surface transportation facilities at any of the terminal location alternatives.

E6.2.5 Surface Transportation

The potential traffic impacts of developing the proposed terminal complex at each terminal location alternatives are summarized in Table E-5. The specific location of the site within each alternative influences the number of new lane-miles required on roadways significantly impacted by traffic from the new terminal.

No Action Alternative

Under the No Action Alternative, future surface transportation needs are a result of Houston-Galveston Area Council's (H-GAC) regional growth modeling, referenced in this report as 'background' traffic.' Therefore, the modeling for the No Action Alternative assumed no new container terminal complexes in the Houston-Galveston Area (HGA). A total of 87, 141, and 195 lane miles of improvements are needed for the years 2005, 2015, and 2025 respectively. The study area for the No Action Alternative includes all roadways for all terminal location alternatives.

Bayport Terminal Location Alternative

Several improvements would be required at the roadways impacted by the Bayport terminal location alternative. These are described in Section E5.5 above.

Spilmans Island Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be North Broadway Street, Barbours Cut Boulevard, and SH 146. Development of the proposed terminal facilities at this location would require roadway improvements to SH 225 and North Broadway Street. The intersection of Barbours Cut Boulevard/Broadway Street and the Barbours Cut Boulevard/SH 146 interchange would also need improvements in future years. While no roadway would be affected in the earlier phase (2005), a total of 7 and 32 lane miles of improvements would be needed on roadways for 2015 and 2025, respectively. Most of the required improvements would be needed in the future. The exceptions would be the widening of North Broadway Street from the alternative to Barbours Cut Boulevard and modifications of the intersection of Barbours Cut Boulevard and North Broadway Street.

Shoal Point Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be SH 197, SH 146, and I 45. Facilities such as Interstate 45 and SH 146 would need improvements in future years to support the Shoal Point terminal location alternative. Likewise, the intersection of SH 197/SH 146 and the intersection of SH 197 with the project entrance roadway would be major improvements. A total of 1, 22, and 130 lane miles of improvements would be needed on roadways for 2005, 2015, and 2025, respectively. With the exception of the widening of SH 197 and the alternative related intersection improvements, all other identified roadway improvements would be needed.

Cedar Point Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be FM 2354 and Spur 55. SH 146, Spur 55, FM 1405, and FM 2354 would need improvements in future years for the Cedar Point terminal location alternative. Approximately 20 and 65 lane miles of improvements would be needed on roadways for 2015 and 2025, respectively. The roadway improvements directly attributable to the project would include the construction of a new access road (4 lanes) from the alternative to Spur 55 and the widening of FM 2354 (from 2 to 4 lanes) from Spur 55 to Texas Avenue.

Pelican Island Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be Harborside Drive and I 45. SH 146, I 45, and the Pelican Island Parkway would need improvements in future years for the Pelican Island terminal location alternative. Approximately 120 lane miles of improvements would be needed on roadways for the year 2025. Most of the required improvements would be needed regardless of whether or not the complexes are built at this location. Exceptions would be the widening of the Pelican Island Causeway (from 2 to 4 lanes) from the alternative to Harborside Boulevard. Also, modifications would be necessary for the Harborside/I 45 interchange and the Harborside Boulevard/ 51st Street intersection.

Shoal Point/Bayport Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be Port Road, SH 146, and SH 197. This alternative would result in a need for improvements in future years to Port Road, Bay Area Boulevard, Red Bluff Road, SH 197, and SH 146. Approximately 16 and 44 lane miles of improvements would be needed on roadways for 2015 and 2025, respectively. The need for improvements is triggered by the estimated increases in future background traffic, (i.e., traffic not generated by the project). Most of the roadway improvements would be needed regardless of whether or not the terminal complexes are built. The exceptions would be the widening of Port Road (from 2 to 4 lanes) from Bayport to SH 146 and the widening of SH 197 (from 5 to 6 lanes) from Shoal Point to I 45.

Upper San Jacinto Bay/Bayport Terminal Location Alternative

The primary roads affected by traffic from a terminal complex at this location would be Port Road, SH 145, SH 225, and Millers Cut Off Road. Facilities such as Port Road, SH 146, Millers Cut Off Road, and SH 225 would need improvements in future years. A total of 14 and 48 lane miles of improvements would be needed on roadways for 2015 and 2025, respectively. The required widening of Port Road (from 2 to 4 lanes) from Bayport to SH 146 and the upgrade of Millers Cut Off Road from Upper San Jacinto Bay to SH 225 would be improvements directly attributable to the project.

E6.2.6 Community Infrastructure and Municipal Services

Many of the impacts of developing the terminal complexes would be similar at all the terminal location alternatives, including temporary impacts associated with construction, the impacts of road and rail rights-of-way, the need for wastewater treatment, and the need for substantial electric power. Cruise ships require large volumes of potable water, so the impact of the terminal location alternatives would differ in relation to the number of cruise ship berths they would accommodate. The terminal location alternatives would also differ in terms of whether their use would require the development of new water supply or waste treatment plants, as indicated in Table E-5.

E6.2.7 Navigation

Table E-5 compares the distance of each terminal location alternative from the Galveston Sea Harbor Buoy, the projected increase in one-way commercial vessel transits in the access waterway to each location, and the potential for conflicts between commercial vessels associated with the terminal complexes and recreational boating or commercial fishing. The greatest potential for conflicts with recreational boating are associated with the Bayport and Pelican Island locations due to the proximity of these alternatives to existing yachting facilities.

E6.2.8 Noise

The potential noise impacts of developing the proposed terminal complex at each terminal location alternatives are summarized in Table E-5. No adverse impacts were identified for the No Action Alternative, the Spilmans Island terminal location alternative, or the Shoal Point terminal location alternative. Nighttime (10:00 p.m. to 7:00 a.m.) dredging and pile construction would result in adverse noise impacts for the Bayport, Pelican Island, Cedar Point, Shoal Point/Bayport, and Upper San Jacinto Bay/Bayport terminal location alternatives. No adverse impacts were identified for any alternative as a result of vehicular traffic. Adverse noise impacts based on sound levels from operations and the intermodal yard were identified for the Bayport, Pelican Island, Shoal Point/Bayport, and Upper San Jacinto Bay/Bayport terminal location alternatives.

E6.2.9 Aesthetics and Light

Under the No Action Alternative the visual character of the Bayport site would not be changed by the development of terminal complexes. The character of the alternative is likely to become similar to nearby industrial complexes, with corresponding impacts on the viewsheds, ambient light levels, and nightglow at nearby residential areas.

Development of the terminal complexes would change the visual character at any of the terminal location alternatives from generally undeveloped to a well-lighted 24-hour transportation facility with high-mast lighting. The viewshed toward the complexes from water side locations would become bulkheads, vessels, and cranes. The viewshed toward the complexes from landside locations would become container storage yards, intermodal yards, and truck gates. If a noise and light berm were installed around the landward sides of the complexes at any of the locations, the viewshed toward the complexes would be a vegetated berm. The impacts of the terminal complexes on the viewsheds, ambient light levels, and nightglow would differ between the terminal location alternatives in direct relation to the proximity of residential areas. The proximity of each location to residential areas is compared in Table E-5.

E6.2.10 Cultural Resources

Projected and potential impacts to known and predicted cultural resources within and near each of the terminal location alternatives are summarized in Table E-5.

E6.2.11 Parks and Recreation

No impact would occur to recreational properties associated with or having access to the Bayport, Spilmans Island, Shoal Point, or Upper San Jacinto Bay terminal location alternatives. The Cedar Point terminal location alternative would result in less than substantial, long-term adverse impact due to loss of localized recreational opportunities associated with nature appreciation. The Pelican Island terminal location alternative would result in a less than substantial, short-term adverse impact if modifications to roadway access to Seawolf Park impair public access.

E6.2.12 Air Quality

The potential air quality impacts of developing the proposed terminal complex at each terminal location alternatives are summarized in Table E-5. The No Action Alternative will result in NO_x, VOC, CO, SO_2, and PM_{10} emissions generated by the transport of cargo into the HGA from other ports. This would result in a long-term adverse impact.

The development of the proposed terminal facilities would result in emissions from construction, as discussed for the Proposed Project in Section E5.12 above. These impacts would, in general, be greater for terminal location alternatives other than Bayport, as they would require additional stabilization and/or an increase in elevation. Airshed atmospheric loading of NO_x, SO_2, and PM_{10} due to terminal complex operations at any of the terminal location alternatives would result in long-term adverse impacts. The magnitude of these impacts at any of these locations is similar to that of the Bayport terminal location with limited variations due to the number of cruise ship berths, different sailing distances from the entrance to Galveston Bay, and different offsite truck travel distances.

Ozone resulting from NO_x and VOC emissions related to construction and operation of any of the terminal location alternatives would result in long-term, less than adverse impacts. CO emissions at intersections nearby any of the alternatives are expected to result in air quality levels within the NAAQS.

E6.2.13 Public Safety

The construction and operation of the terminal complexes at any of the terminal location alternatives is not anticipated to adversely affect, or be affected by, various elements of public safety. General growth in public safety services in the HGA is expected to be adequate to serve the terminal complexes at any of the terminal location alternatives. Construction or operation of the terminal complex at the alternative terminal locations would not affect hurricane evacuation. Due to the fact that truck volume would be similar for any of the alternative terminal locations, the potential for increased hazardous material spills would be similar.

E6.2.14 Hazardous Materials

The types of hazardous materials transported through or used at the terminal complexes at any terminal location alternative are not expected to differ appreciably from the types that occur at the Barbours Cut facility, where less than 5 percent of the cargo contains some hazardous materials. State and Federal hazardous materials transportation regulations would mandate spill prevention procedures, but the proportionate increase in hazardous materials transferred would be expected to result in a proportional increase in spill events.

E6.2.15 Shoreline Erosion

Under the No Action Alternative, the potential for shoreline erosion from vessel traffic would likely continue or slightly increase for unprotected shoreline areas. Terminal complex development at any of the terminal location alternatives would not cause significant adverse impacts from shoreline erosion. Limited unprotected shoreline areas of Pelican Island south of Seawolf Park, Cedar Point, and Upper San Jacinto Bay could experience erosion from increased wave energy. However, shoreline protection would be provided as part of the terminal construction to mitigate the effects from current or increased erosion.

E6.2.16 Hydrology, Drainage, and Floodplains

The present land use would be altered at each terminal location alternative. The drainage systems would be designed to comply with floodplain regulations applicable to the respective study areas. With appropriate drainage system designs, stormwater from each terminal location alternative could be discharged to nearby receiving water bodies without substantial impacts on flooding conditions in the vicinity. Table E-5 indicates the affected water bodies, the additional paved areas that would be created, and the percentage of the alternative layout within the 100-year floodplain for each of the terminal location alternatives. All of the terminal location alternatives would be subject to inundation by storm surge unless ground elevations were raised above applicable flood elevations.

E6.2.17 Water Quality

Construction and operation of the proposed terminal complexes at any of the alternative locations would comply with TPDES regulations for stormwater and wastewater discharges. Generally, similar types of mitigation measures and BMPs would be applicable at each location. The area footprint would be similar except at the Shoal Point/Bayport and Upper San Jacinto Bay/Bayport where a few elements of the infrastructure may be required at each of the locations. It is expected that the quality and quantity of discharges from the terminal complexes to potential receiving water bodies would not be significantly different from one location to the other.

Dredging navigation features would create pockets of low DO during summer months at each terminal location alternative. Potential receiving water bodies in the vicinity of each terminal location alternative have a medium TMDL priority except for one water quality segment in the vicinity of Spilmans Island, which has a high priority and the Texas City Ship Channel at Shoal Point, which has a low priority. In summary, water quality impacts would not differ substantially between terminal location alternatives, and impacts would be controlled by structural and engineering controls as described in the permit application.

E6.2.18 Aquatic Sediments and Dredging

The development of navigational features at any of the terminal location alternatives would involve substantial dredging and placement of aquatic sediments and upland soils. The volume of dredging required for each terminal location alternative is presented in Table E-5. Development of the complexes at any of the terminal location alternatives would result in additional maintenance dredging volumes and the need for additional dredged material placement area capacity within an economical distance of the location. Developing the complexes at the Spilmans Island, Shoal Point, and a portion of Pelican Island sites would displace existing active dredged material placement areas and require replacement of the present holding capacity provided by those sites.

The impacts of dredging activities at any terminal location alternative would include both short-term and long-term changes in surface sediments, particularly in new deepwater areas. The surface sediments in dredged areas would generally be finer after dredging than the sediments that were in the area prior to dredging.

The following approximate areas of upland soils would be excavated at each terminal location alternative: 17 acres at the Bayport location and the Bayport portion of either combination alternative; 247 acres at the Spilmans Island location; 8 acres at the Shoal Point location; 241 acres at the Cedar Point location; 191 acres at the Pelican Island location; and 0 acres at the Shoal Point portion of the Shoal Point/Bayport location; 0 acres at the Upper San Jacinto Bay portion of the Upper San Jacinto Bay/Bayport location. None of the location alternatives would affect the regional geology of their respective county.

E6.2.19 Wetlands

The area of jurisdictional wetlands that would be impacted at each terminal location alternative is presented in Table E-5. There are additional freshwater wetlands at each location that are discussed as aquatic resources under Ecology below.

Under the No Action Alternative, development at the Bayport terminal location alternative of additional facilities would have impacts on wetlands similar to those projected for the terminal complex. Any type of development that did not specifically avoid existing wetlands would result in wetland losses. It is expected that any jurisdictional wetlands impacted would require mitigation pursuant to USACE regulations.

Development of the proposed terminal facilities at the Bayport site would result in the loss of approximately 106 acres of freshwater wetlands. However, only 2.5 acres of these 106 acres of wetlands are jurisdictional (King, 2001). The remaining wetland acreage is considered to be “aquatic resources.”

Development of the terminal complex at the other terminal location alternatives would result in the following approximate wetland losses:

- Spilmans Island — 3 acres estuarine
- Shoal Point — 13 acres estuarine
- Cedar Point — 165 acres freshwater, 14 acres estuarine
- Pelican Island — 48 acres freshwater, 30 acres estuarine
- Shoal Point/Bayport — 88 acres freshwater, 13 acres estuarine
- Upper San Jacinto Bay/Bayport — 105 acres freshwater

E6.2.20 Ecology

The facilities that would be most likely developed at the Bayport location under the No Action Alternative would result in similar effects to biotic communities as construction and operation of the proposed terminal complexes. Commercial non-containerized vessel growth is expected to increase in the Galveston Bay area at a rate of approximately 3.3 percent per year, so it is likely that some form of water-dependent heavy industrial use of this property would result. The No Action Alternative would not have either a beneficial or adverse affect on nonindigenous species introduction in the overall area.

Table E-5 presents the comparative impacts of developing the proposed terminal complexes at each terminal location alternative on upland habitats, freshwater and estuarine wetlands, bay bottoms, bird rookeries, and essential fish habitat.

Impacts to protected upland species are not expected at any of the terminal location alternatives. Construction at any of the terminal location alternatives has the potential to impact protected sea turtles and transient bird species, but these species are mobile and can avoid these areas. Bird foraging habitat would be reduced by terminal development at any of the locations. Increased ship traffic and dredging associated with any of the sites may potentially affect rare reptile species through risk of injury and disruption of movement patterns.

All of the terminal location alternatives would result in the same number of additional containership calls on Galveston Bay. Thus, all alternatives would contribute approximately equal volumes of increased ballast water, and the associated potential for introduction of nonindigenous species.

E7.0 SUMMARY

In summary, the Applicant's proposed project, the Bayport Container and Cruise Terminal Facility, along with other alternatives, is evaluated in this Draft Environmental Impact Statement. After the receipt of all comments submitted on the Draft EIS, the USACE will prepare a Final EIS that incorporates and considers those comments. A notice of availability of the Final EIS will then be published in the Federal Register.

Thirty days after publication of the availability the USACE will finalize the Record of Decision. This decision will be to: issue the permit, issue the permit with modification or conditions, or, deny the permit.